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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Joachim Kiefer

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EXAMINER

HU, HENRY S

ART UNIT

PAPER NUMBER

1796

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/506,646

Applicant(s)

KIEFER ET AL.

Examiner

HENRY S. HU

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment of April 16, 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-22, 24-29 and 35 is/are pending in the application.
- 4a) Of the above claim(s) 26-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-22, 24, 25, 29 and 35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 16-22, 24-29 and 35 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsman's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4-16-2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

1. USPTO has received three things including: (A) **Amendment**, (B) **Declaration** (written by Thomas J. Schmidt), and (C) **IDS** (2 pages) filed on April 16, 2009, which are in response to non-final office action filed on November 12, 2008. With such an amendment, **Claims 16, 24, 29 and 35 are amended; Claim 23 and non-elected Claims 30-34 are cancelled, while no new claim is added.** To be more specific, parent **Claim 16** is amended in four ways including: (A) to incorporate the limitation from **Claim 23** for intrinsic conductivity being at least 0.001 S/cm, (B) to clarify the mixing is for a polymer and a vinyl-containing phosphoric acid so as to overcome claim objection, (C) to add that the resultant membrane is in IPN network structure, and (D) to add that at least 10% by weight of the monomer vinyl-containing phosphoric acid is used in step (a). Applicants allege that the support is from page 9 in the middle of Remarks.
2. Based on the fact that originally independent Claims 29 and 35 are now amended to be dependent from parent Claim 16, both Claims 29 and 35 are joined with elected parent Claim 16. With such an amendment, **Claims 16-22, 24-29 and 35** with two independent claims (Claims 16 and 26) are now pending, while non-elected three groups including Group II (Claims 26-28) are still withdrawn from consideration. An action follows.

DETAILED ACTION

Response to Argument

3. Applicant's argument filed on April 16, 2009 has been fully considered but they are not persuasive. The focal arguments related to the patentability will be addressed as follows: Such

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an amendment involves four things on parent Claim 16: (A) to incorporate the limitation from **Claim 23** for intrinsic conductivity being at least 0.001 S/cm, (B) clarify the mixing is for a polymer and a vinyl-containing phosphoric acid, (C) to clarify the membrane is in IPN network structure, and (D) at least 10% by weight of the monomer vinyl-containing phosphoric acid is used in step (a). After a very close consideration, previous 102 and/or 103 rejections are modified into 102/103 rejections. **Final action is thereby applied** according to MPEP as follows:

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. The limitation of “once-amended” parent **Claim 16** in present invention relates to *a proton-conducting polymer membrane based on polyvinylphosphonic acid obtained by a process comprising the steps:*

(a) mixing a polymer and a vinyl-containing phosphonic acid

(b) forming a two-dimensional structure using the mixture of step (a) on a carrier, and

(c) polymerizing the vinyl-containing phosphonic acid present in the two-dimensional structure of step (b), thereby producing a polymer interpenetrating network (IPN),

wherein the membrane has a thickness in the range from 15 μm to 1000 μm .

wherein the product obtained in step (a) includes at least 10% by weight of vinyl-containing phosphoric acid; and

wherein the intrinsic conductivity of the proton-conducting polymer membrane at temperature of 160 °C is at least 0.001 S/cm.

See other limitations of dependent Claims 17-22, 24-25, 29 and 35.

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7. **Claims 16-22, 24, 29 and 35 are rejected** under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Suzuki et al. (US 6,607,856 B2** with a foreign priority at November 29, 1999) for the reasons set forth in paragraphs **6-8** of office action dated 11-12-2008 as well as the discussion below.

8. **Claim 25 is rejected** under 35 U.S.C. 103(a) as being unpatentable over **Suzuki et al. (US 6,607,856 B2) in view of Gascoyne et al. (US 2003/0031909 A1)** for the reasons set forth in paragraphs **10-11** of office action dated 11-12-2008 as well as the discussion below.

9. As discussed in Non-Final action filed on November 12, 2008, IPN formation process has been shown on Suzuki's **Figure 9** by **polymerization and/or crosslinking a monomer within the polymer chains of an electrolyte membrane.** As pointed out by Applicants on page 12 at top of Remarks, the processes of Suzuki's Examples 1, 3 and 5 include a step in which polymeric chains of polyvinylphosphonic acid are mixed with ETFE-g-PSt. Based on the fact that a first polymer, ethylene-tetrafluoroethylene-graft-polystyrene (ETFE-g-PSt) has been doped with a second polymer, polyvinylphosphonic acid along with the polymerization/crosslinking process in Figure 9, Suzuki's IPN structure may be similar to the claimed IPN obtained from Applicants' in-situ polymerization of vinyl-containing phosphoric acid within a polymer matrix.

10. Regarding Suzuki may uses only 9% by weight or even 7% by weight of monomer vinyl-containing phosphoric acid (see Applicants' argument on page 12 of Remarks), attention is

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directed to three facts including: (A) Suzuki's number is close to the claimed 10 wt%, (B) other monomer divinylbenzenesulfonic acid (see Examples 18 and 19) is used together with monomer vinyl-containing phosphoric acid, and (C) Suzuki may have achieved the necessary degree of crosslinking even less amount in monomer vinyl-containing phosphoric acid is indeed applied so that the claimed property such as intrinsic conductivity is obtained.

11. In light of the fact that the prior art and the present invention recite substantially identical IPN structure as well as the polymerization/crosslinking mechanism to prepare IPN with additional monomer such as divinylbenzenesulfonic acid has been presented by Suzuki, a reasonable basis exists to believe that such a IPN structure of the invention inherently possess the same properties such as intrinsic conductivity. Since PTO does not have proper means to conduct experiments, the burden of proof is now shifted to Applicants to show otherwise. *In re Best*, 195 USPQ 430 (CCPA 1977).

It has been held that where applicant claims a composition in terms of function, property or characteristic where said function is not explicitly shown by the reference and where the examiner has explained why the function, property or characteristic is considered inherent in the prior art, it is appropriate for the examiner to make a rejection under both the applicable section of 35 USC 102 and 35 USC 103 such that the burden is placed upon the applicant to provide clear evidence that the respective compositions do in fact differ. *In re Best*, 195 USPQ 430, 433 (CCPA 1977); *In re Fitzgerald et al.*, 205 USPQ 594, 596 (CCPA 1980).

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12. In summary, previous 102 and/or 103 rejections are modified into 102/103 rejections with current situation on parent Claim 16. **Final action is thereby applied** according to MPEP. Further amendment on parent Claim 16 is suggested accordingly.

Conclusion

13. Applicant's amendment **necessitated the new ground(s) of rejection presented in this Office action.** Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Vasu Jagannathan, can be reached on (571) 272-1119. The **fax** number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peter D. Mulcahy/
Primary Examiner, Art Unit 1796

/Henry S. Hu/
Examiner, Art Unit 1796

June 18, 2009